

ASH GROVE CEMENT COMPANY



PO Box 38069 HWY 132
Leamington, Utah 84638
Phone: 435-857-1212
FAX: 435-857-1288

Type V

Production Period: August 1 thru August 31, 2015

Date: 9/15/2015

The following information is based on average test data during the production period. The data is typical of cement shipped from the Leamington, Utah plant. Individual shipments may vary.

STANDARD REQUIREMENTS ASTM C150-12, Tables 1 and 3

CHEMICAL				PHYSICAL			
Item	A.S.T.M. Test Method	Spec. Limit	Test Result	Item	A.S.T.M. Test Method	Spec. Limit	Test Result
SiO ₂ (%)	C114	A	21.03	Air content of mortar (volume %)	C185	12 max	10
Al ₂ O ₃ (%)	C114	A	3.86	Fineness (cm ² /g):			
Fe ₂ O ₃ (%)	C114	A	3.62	Air permeability	C204	2600 min	4232
CaO (%)	C114	A	63.55	Autoclave expansion (%)	C151	0.80 max	0.02
MgO (%)	C114	6.0 max	2.06	Compressive strength (psi)			
SO ₃ (%)	C114	D	2.75	1 Day	C109	A	2088
Loss on ignition (%)	C114	3.0 max	2.44	3 Days	C109	1160 min	3580
Na ₂ O (%)	C114	A	0.04	7 Days	C109	2180 min	4561
K ₂ O (%)	C114	A	0.71	28 Days	C109	3050 min	C
Insoluble Residue (%)	C114	0.75 max	0.27	Time of setting (minutes)			
CO ₂ (%)	C114	A	1.48	(Vicat)			
Limestone (%)	C114	5.0 max	3.8	Initial: Not less than	C191	45	90
CaCO ₃ in limestone (%)	C114	70 min	89.3	Not more than		375	90
Potential compounds (%)				Mortar Bar Expansion	C1038	0.020 max	0.001
C ₃ S	C114	A	55				
C ₂ S	C114	A	18				
C ₃ A	C114	5 max	4				
C ₄ AF	C114	A	11				
C ₄ AF + 2(C ₃ A)	C114	25 max	19				

OPTIONAL REQUIREMENTS ASTM C150-12, Tables 2 and 4

CHEMICAL				PHYSICAL			
Item	A.S.T.M. Test Method	Spec. Limit	Test Result	Item	A.S.T.M. Test Method	Spec. Limit	Test Result
Equivalent alkalis (%)	C114	0.60	0.51	False set (%)	C451	50 min	76
				Heat of hydration (kJ/kg)			
				7 days	C186	A	C

A = Not applicable.

B = Limit not specified by purchaser, test result provided for information only.

C = Test results for this period not available.

D = C 1038 expansion in water does not exceed 0.02% at 14 days

We certify that the above described cement, at the time of shipment, meets the chemical and physical requirements of ASTM C150-12 (Type V) or (other) _____ specification.

Signature:

Heath Hall

Title: Chief Chemist

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Additional Data

Inorganic Processing Addition Data

Type	Limestone
Amount(%)	3.77
SiO ₂ (%)	6.28
Al ₂ O ₃ (%)	0.47
Fe ₂ O ₃ (%)	1.13
CaO (%)	49.93
SO ₃ (%)	0.09

Base Cement Phase Composition

C ₃ S	57
C ₂ S	19
C ₃ A	4
C ₄ AF	12

Signature:

A handwritten signature in black ink, appearing to read "Heath Hall", written over a horizontal line.

Heath Hall

Title: Chief Chemist